Principles of Programming Languages

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Office Hours	Tuesdays, 1-2pm and
	Fridays, 11am–1pm
	or by appointment
	in TPL 306
Lectures	Tuesday and Thursday 9:55–11:10am
	in Schow Library Classroom 030A
Web Page	http://williams-cs.github.io/cs334-s22-www

Readings

- **(Required)** CSCI 334 Course Packet

- **(Required)** Additional readings will be posted on the course web site.

- **(Optional)** *Practical C Programming*, Steve Oualline.

Course Objectives

Why do we have so many programming languages? Many of them, like Java and C#, do more or less the same thing. Others, like C and Prolog, are wildly different. A key insight is that programming languages are designed <u>for humans</u>, not for computers. Another important insight is that they are often designed for certain <u>tasks</u>. In this class, we will explore language designs, and why and how different design choices can affect human productivity and program correctness. We will also "get under the hood" of a programming language, which will give you deep insights into how they work.

Outcomes. At the end of this course, you should be able

1. to know how to quickly learn an unfamiliar programming language;

2. to understand the inner workings of programming languages; and finally

3. to speak the "language of languages," so that you can talk about computation <u>independently</u> of a given programming language.

As in other CS courses, we will discuss alternative approaches for solving the same problem. Because programming languages are intrinsically tied up in (and motivated by) programming problems, we will not only investigate their features, but also the problems that led to their development.

Workload

Expect to spend roughly 10 hours per week on this class and its activities. Students in previous sections tell me that this amount of time is an accurate estimate of the time they spent. I strongly encourage you to block out time to work on CS334 problem sets. Starting early will also significantly reduce your stress level.

Lectures

Attendance for lectures is mandatory. I expect you to attend and participate.

Website

I post lecture slides and example code to the course website shortly after class, and add links to assignments and readings as they are assigned. Develop the habit of checking the website regularly.

Assignments

There are kinds of homework assignments in this class.

1. **Reading checks** ask you to reflect on a lab's required reading (due Wednesday evenings by 10pm).

2. **Labs** are a combination of problem sets with written answers and programming assignments (due Sunday evenings by 10pm).

Reading checks are open-book quizzes that test your knowledge of the course readings, administered via GLOW. You can find assigned readings in the current lab handout. Labs are assigned weekly, typically at least a week ahead of the due date and will be posted to the course website.

All lab work should:

- be completed and pushed to Gitlab <u>no later than</u> 10pm on the due date;

- include source code for questions involving programming;

- be typeset using LaTeX for non-programming questions (e.g., proofs); and

- list any student partners with whom you discussed the problems (see Honor Code handout).

  Homework will not be accepted on paper or via email.

Lab Resources for Homework Assignments

You are strongly encouraged to use the Computer Science Department's Unix "lab" computers for the programming problems. These computers are preconfigured with all of the required software. If you are not familiar with the Unix computing environment, please speak with me or the TAs as soon as possible so we can bring you up to speed on what you need to know. You may also see either Kelsey Gura or Lida Doret to reset your Unix password if you have forgotten it.

Two computer labs are available for use in this class:

1. The "UNIX Lab" in TCL 312 and

2. the "Ward Lab" in TBL 301.

You may use your personal computer for assignments, but please be advised that if you do so, technical support issues are your own responsibility.

Exam and Final Project

There will be a midterm exam covering both lectures and readings. Your final evaluation will be a group programming project and presentation.

Grading

Your final grade will be determined according to the following formula:

Midterm:	25%
Final Project:	25%
Homework assignments:	30%
Quizzes:	10%
Attendance:	10%

Grades understandably cause anxiety among many students. If you are spending lots of mental energy worrying about grades, please see me and we can discuss your worries in private. I try to give you a great deal of control over your final grade, and while I can't promise you an A, any student who earnestly applies themselves to the challenges in this course and learns from their mistakes has little to worry about. Just do your best.

Late Work and Resubmissions

Late Work. You are expected to turn in all assignments in a timely manner to receive full credit. Please contact me ahead of time to discuss the matter if you foresee an issue that prevents timely submission. Without prior arrangement, late assignments will be penalized at a rate of **20% per day**.

Resubmissions. The assignments in this course are designed to challenge you. You may find that occasionally, you do not do as well on an assignment as you had hoped. To encourage you to revisit and master this material, I allow up to two assignment resubmissions during the semester. This policy includes labs 1–9 and the midterm exam, but not quizzes, the final lab, or the final project.

A resubmission will be accepted at the discretion of the course instructor and allows you to earn back **up to 50% of the missing points**. For example, if you received a 75% on an assignment, you may earn up to 87.5% upon resubmission.

Resubmissions must be submitted in the following manner:

1. They must be submitted before the end of the final exam reading period.
2. They must include both the original work and the new submission.
3. They must be accompanied with a typed document, written in plain language, that explains, for every misunderstanding:
   (a) what the error is in the original work,
   (b) how you fixed the error, and
   (c) why the new version is correct.

Please note that resubmissions must be typed or they will not be accepted. Detailed instructions for submitting a resubmission will be distributed via a separate handout.

COVID-19

All of us face the possibility that we will become ill during the COVID-19 pandemic. I consider **your health to be your top priority**. Falling ill is not your fault, and your grade should not suffer as a result. If you contract the virus, I ask that you inform me as soon as possible. Should you fall ill, you are welcome to continue participating (virtually) in the class if you feel healthy enough to do so. If you do not feel healthy, consider your semester as "on hold" with no negative consequences. In coordination with the college deans, I will revisit your academic plan once you regain your health.

Help!!!

There are many resources available when you need it. You are encouraged to discuss any questions, concerns, difficulties, or thoughts about the course with me. In addition, TAs are available to help you with challenges you face as you work through the course material and lab assignments. You are welcome at any time to approach any course staff to ask for clarification of the assignments, and to discuss your problem-solving process. You do not need to wait until you are stuck and frustrated to speak with us!

If you find yourself facing challenges beyond the typical, please do not stay silent. Talk to your instructor, a friendly face from the Dean's Office, or one of the many professionals across campus who stand ready to help. All faculty and staff at Williams are bound by the Family Educational Rights and Privacy Act (FERPA) to maintain the privacy of your educational records. We understand that difficulties arise, and we are prepared to help you.

You will never be penalized for seeking help!

Contrary to popular belief, the most successful students are not "effortlessly successful." Instead, they get to know course staff early on and they familiarize themselves with an institution's academic support resources. Williams has ample support resources, including

- The Peer Tutor Program: Tutors can be arranged when 1-on-1 help is required beyond that available from your instructor and TAs.

- Math & Science Resource Center: Support is available for students grappling with the more quantitative aspects of their coursework.

- Accessible Education and Disability Support Center: Students with documented disabilities may require accommodations in certain situations.

- The Health Center: Sometimes your challenges are not course-related. The Health Center provides a range of medical, psychological, and health/wellness services.

Inclusivity

The Williams community embraces diversity of age, background, beliefs, ethnicity, gender, gender identity, gender expression, national origin, religious affiliation, sexual orientation, and other visible and nonvisible categories. I welcome all students in this course and expect that all students contribute to a respectful, welcoming and inclusive environment. If you feel that you are not being welcomed, included, or accepted in this class, please come to me or a college administrator to share your concerns. You may be surprised to learn that I have these conversations with students regularly and even welcome them. Our shared goal is computer science—if I can help you remove obstacles on the way to that goal, I am always happy to help.